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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,723	08/07/2001	Toshiyuki Ogata	Q65755	1261

7590 07/02/2003

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EXAMINER

LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 07/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/922,723

Applicant(s)

OGATA ET AL.

Examiner

Sin J Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuchiya et al (5,882,844).

Tsuchiya teaches a chemically amplified positive resist composition comprising an alkali soluble base resin in the form of polysiloxane of formula (1), a photoacid generator, and a dissolution rate-regulating compound having at least two phenolic hydroxyl groups in a molecule, the hydrogen atom of the phenolic hydroxyl group being replaced by an acid labile group. See col.2, lines 22-26, lines 56-67, col.3, lines 43-57. Therefore, the prior art teaches present invention of claim 1.

As a specific example for the dissolution rate-regulating compound mentioned above, Tsuchiya teaches (see Example 2 and 10), a dissolution rate regulator, DRR.1, which structure is

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shown on top of col.29. The DRR.1 teaches present compound (C) of claim 8 in which at least one hydrogen atom of the hydroxyl group of present formula (I) is substituted with tertiary butoxy carbonyl group (which is also claimed in present claim 9). In the present formula (I), A would be an alkylene group having 3 carbon atoms, Z would be hydroxyl groups, and R^1 - R^3 would all be hydrogen atoms. Therefore, the prior art teaches present inventions of claims 8 and 9.

With respect to present claim 10, Tsuchiya teaches (col.23, lines 26-34, lines 44-50) that his resist material is useful as a two-layer resist and that more particularly, a relatively thick organic polymer layer is formed on a substrate as a lower resist layer before his resist solution is spin coated thereon. Tsuchiya also teaches that his resist film is generally 0.1 to 2 μm thick. Since 0.1 μm (100 nm) is included as the lower end of the taught range, it is the Examiner's position that one of ordinary skill in the art would immediately envisage forming Tsuchiya's resist film into 0.1 μm thickness. Therefore, the prior art teaches present invention of claim 10.

3. Claims 1, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Takemura et al (5,691,396).

Takemura teaches a positive resist material containing a polysiloxane compound of their formula (I) as an alkali soluble polymer and a photoacid generator. See abstract and col.4, lines 33-42. Takemura also states that a dissolution inhibitor is optionally added to the resist composition, and based on this teaching, it is the Examiner's position that one of ordinary skill in the art would immediately envisage adding a dissolution inhibitor to Takemura's resist

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composition. Takemura teaches (col.12, lines 4-16) bisphenol A derivatives wherein the phenolic OH groups are converted into tert-butoxycarbonyl groups (see the chemical structure shown in col.12, lines 10-14) as the dissolution inhibitor used in his resist composition.

Therefore, the prior art teaches present invention of claim 1.

Also, the dissolution inhibitor mentioned above teaches present compound (C) of claim 8 in which at least one hydrogen atom of the hydroxyl group of present formula (I) is substituted with tertiary butoxycarbonyl group (which is also claimed in present claim 9). In the present formula (I), A would be an alkylene group having 3 carbon atoms, Z would be hydroxyl groups, and R¹-R³ would all be hydrogen atoms. Therefore, the prior art teaches present inventions of claims 8 and 9.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tokutake et al (JP 04-130324 and its English abstract) in view of Honda (5,565,304).

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The Japanese document has been submitted for English translation. Only the English abstract is available at this time. Tokutake teaches (see the English abstract) a positive type resist containing an alkaline-soluble ladder type silicone polymer, which has repeating units of (HO-C₆H₄-CH₂-SiO_{3/2}) and repeating units of (C₆H₄-CH₂-SiO_{3/2}), and 1,2-naphthoquinone diazide group containing compound (a photoacid generating compound). The repeating unit of (HO-C₆H₄-CH₂-SiO_{3/2}), which is *hydroxybenzylsilsesquioxane* unit, is presently claimed siloxane unit containing an alkali-soluble group (hydroxyl group), and as shown in the formula, the hydroxyl group is bonded to the silicon atom of the siloxane group through a benzyl group (an aralkylene group). The repeating unit of (C₆H₄-CH₂-SiO_{3/2}), which is benzylsilsesquioxane unit, is presently claimed siloxane unit containing an alkali-insoluble group (an aralkyl group) having no acid-decomposable group.

Therefore, Tokutake teaches present inventions of claims 1-6 except for the present component (C) which is a compound in which at least one hydrogen atom of the phenolic hydroxyl group or carboxyl group of the compound is substituted with an acid-decomposable group. Honda teaches (col.2, lines 63-67, col.3, lines 1-42, col.6, lines 27-48) adding dissolution inhibitors to a photoresist composition containing an alkali-soluble resin and a photoacid generating compound in order to control the dissolution rate of the photoresist composition films, particularly to inhibit the dissolution of the resist films in unexposed areas, while they can be deprotected by acid moieties generated from a photoacid generator under irradiation to enhance the dissolution rate of the resist films in exposed areas. Honda teaches that preferably those

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inhibitors are selected from a family of oligomeric *phenolic compounds, the hydroxyl groups of which are protected with substituents (such as tert-butoxycarbonyl, tert-butyl, or tetrahydropyranyl group) which can be deprotected in the presence of acidic compounds*. In particular, Honda teaches 1-[1'-methyl-1'-(4'-hydroxyphenyl)ethyl]-4-[1',1'-bis(4-hydroxyphenyl)-ethyl]-phenol (also known as TRISP PA) as a good candidate of the backbones of the dissolution inhibitor added for the purpose of enhancing the contrast between the unexposed and exposed areas. Since Tokutake also teaches a photoresist composition containing an alkaline soluble resin and a photoacid generating compound, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to add a dissolution inhibitor such as TRISP PA to Tokutake's positive photoresist composition in order to enhance the contrast between the unexposed areas and exposed areas as taught by Honda. The chemical structure for TRISP PA, which is enclosed here, teaches present formula (I) of claim 8. In the present formula, Z's would be hydroxyl groups, R¹-R³ would all be hydrogen atoms, and A would be -C[Me][C₆H₄-C(Me)(Me)-C₆H₄-OH]- which meets the present second chemical formula represented for A (in the present formula, R⁴ would be a methyl group, R⁷ and R⁸ would be methyl groups, R⁵ and R⁶ would be hydrogen atoms, and Z would be a hydroxyl group). Therefore, Tokutake in view of Honda would render obvious present inventions of claims 1-6, 8, and 9.

6. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al (JP 2001-51422 and its machine-assisted English translation provided by Japan Patent Office) in view of Honda (5,565,304).

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Ogata teaches (see the abstract of the machine-assisted English translation) a photoresist composition comprising a photoacid generator and a polysiloxane resin, which comprises a *siloxane unit having alkali-soluble group*, a siloxane unit having the alkali-soluble group substituted by acid-dissociable group, and a *siloxane unit having alkali-insoluble group having no acid dissociable group*. Specifically, Ogata uses (see [0032] of the English translation) the polysiloxane resin which contains phenyl silsesquioxane unit (*as presently claimed in claim 7*), hydroxy benzyl silsesquioxane unit (*as presently claimed in claim 5*), and tert-butoxycarbonyloxy phenyl silsesquioxane unit.

Therefore, Ogata teaches present inventions of claims 1-7 except for the present component (C) which is a compound in which at least one hydrogen atom of the phenolic hydroxyl group or carboxyl group of the compound is substituted with an acid-decomposable group. Honda teaches (col.2, lines 63-67, col.3, lines 1-42, col.6, lines 27-48) adding dissolution inhibitors to a positive photoresist composition containing an alkali-soluble resin and a photoacid generating compound in order to control the dissolution rate of the photoresist composition films, particularly to inhibit the dissolution of the resist films in unexposed areas, while they can be deprotected by acid moieties generated from a photoacid generator under irradiation to enhance the dissolution rate of the resist films in exposed areas. Honda teaches that preferably those inhibitors are selected from a family of oligomeric *phenolic compounds, the hydroxyl groups of which are protected with substituents (such as tert-butoxycarbonyl, tert-butyl, or tetrahydropyranyl group as presently claimed in claim 9) which can be deprotected in the*

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presence of acidic compounds. In particular, Honda teaches 1-[1'-methyl-1'-(4'-hydroxyphenyl)ethyl]-4-[1',1'-bis(4-hydroxyphenyl)-ethyl]-phenol (also known as TRISP PA) as a good candidate of the backbones of the dissolution inhibitor added for the purpose of enhancing the contrast between the unexposed and exposed areas. Since Ogata also teaches a positive photoresist composition containing an alkali soluble resin and a photoacid generating compound, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to add a dissolution inhibitor such as TRISP PA to Ogata's positive photoresist composition in order to enhance the contrast between the unexposed areas and exposed areas as taught by Honda. The chemical structure for TRISP PA, which is enclosed here, teaches present formula (I) of claim 8. In the present formula, Z's would be hydroxyl groups, R¹-R³ would all be hydrogen atoms, and A would be -C[Me][C₆H₄-C(Me)(Me)-C₆H₄-OH]- which meets the present second chemical formula represented for A (in the present formula, R⁴ would be a methyl group, R⁷ and R⁸ would be methyl groups, R⁵ and R⁶ would be hydrogen atoms, and Z would be a hydroxyl group). Therefore, Ogata in view of Honda would render obvious present inventions of claims 1-9.

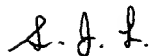
With respect to present claim 10, Ogata teaches (see [0029] of English translation) that a positive resist, or a conventional negative resist film is first applied to a substrate and then the photosensitive layer obtained from his inventive composition is applied thereon in the thickness of 0.05-0.2 μm (50-200 nm). Therefore, Ogata in view of Honda would render obvious present invention of claim 10.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.



S. Lee
June 26, 2003


JANET BAXTER
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